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English/Language Arts Teachers' and Principals' Perceptions of the Value of One-to-One Student Laptops, in Year 5 of the Initiative, in 3 Urban High Schools

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by

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Dedication

I dedicate this work to my incredible family. First, to my husband who pushed me to start and encouraged me to persist. I love you more than words, and I am so blessed to have you as my biggest fan. To my girls who sometimes sat near me while I worked and who encouraged me from the very beginning with a beautiful poster. Let this be a lesson of self-discipline and determination. I look forward to supporting you as you find and follow your own passions. To my parents who always know when I need some words of wisdom and who removed barriers for our family so that this degree could become a reality. Thanks, mom and dad, for instilling the confidence I needed to accomplish this goal.

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Abstract

English/Language Arts Teachers' and Principals' Perceptions of the Value of One-to-One Student Laptops, in Year 5 of the Initiative, in 3 Urban High Schools

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As school districts continue to adopt new technologies and implement one-to-one student laptop initiatives, questions still remain about how this impacts student achievement (Logan, 2016). High school students in the United States continue to rank lower than students in other countries, specifically in reading (National Center for Education Statistics, 2014). Many qualitative and quantitative studies about one-to-one laptop programs in schools have investigated teacher and leader perceptions of classroom technology and its impact on student achievement in the initial implementation phase of the initiative. Results have been generally positive (Zheng, et. al., 2016).

This study investigated the perceptions of 8 English/Language Arts teachers and 3 principals after 5 years of a high school one-to-one laptop initiative in a large, urban school district. The 2 research questions that guided this study were as follows: (1) What are high school English/Language Arts teacher perceptions about the value of one-to-one student devices in year 5 of a high school laptop initiative, and (2) what are the perceptions of principals about the value of one-to-one student devices in year 5 of a high school laptop initiative?

Teachers and principals were purposefully selected at 3 different schools in a large, urban school district. Using qualitative methods with an interpretivist approach, open-ended teacher and principal interviews were the primary tool of data collection for this exploratory study. Transcriptions from interviews were coded using multiple approaches to document common themes. The teacher findings showed that value of the one-to-one initiative was unanimously present in the following areas: (1) Higher-level learning, (2) equality in access including access to digital resources and to Google, (3) writing, (4) efficiency, and (5) searching. Principal findings showed the similar perceptions of higher-level learning and access but also included the theme of collaboration.

In conclusion, this study poses questions for further qualitative and quantitative research in the area of one-to-one student technology in high school. Findings will add to the body of knowledge related to sustaining high school, one-to-one laptop programs and may also be used to inform district participation in one-to-one initiatives, professional development priorities, funding priorities for technology, and policies regarding standardized testing alignment to 21st Century skill development.

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Chapter 1: Introduction to the Study

Technology adoption is growing significantly in public education, and school district interest in one-to-one technology programs is particularly strong, according to a recent report that surveyed 332 district leaders (Logan, 2016). Seventy-one percent of leaders said 25 percent or more of their schools have adopted mobile technology; this is up from 60 percent in 2013. Only 12 percent said their districts had not adopted mobile technology, down from 21 percent in 2013. Eighty-two percent of districts are interested in implementing or expanding a one-to-one mobile device solution within the next two years. Many stakeholders agree that the most commonly expected benefits of using technology in schools are increased student engagement, increased student achievement, and personalized instruction to meet individual students' needs (Logan, 2016). While many research studies (Zheng, et al., 2016) also report positive student academic outcomes in school environments that are rich with technology, a few have disagreed, stating that increasing technology in the classroom, in and of itself, does not increase student achievement. International leader in education technology, Alan November, points this out:

> Adding a digital device to the classroom without a fundamental change in the culture of teaching and learning will not lead to significant improvement. Unless clear goals across the curriculum – such as the use of math to solve real problems – are articulated at the outset, one-to-one computing becomes "spray and pray." (November, 2016, p. 1)

In a recent article published by the *Baltimore Sun* (2017), Baltimore County School District parents openly expressed their concerns about refreshing one-to-one laptops in year 4 of the initiative, while school officials stated that achievement had improved and teaching had become more flexible, responsive, and tailored to student needs. Parents stated that

children in some cases had gone for weeks without their laptops, making the completion of homework more difficult because regular repairs took too long. Also, they said students were off task with the devices in class and regularly bypassed filters. Some Baltimore teachers agreed with the concerns, also stating that accessing curriculum materials online had been difficult (Baltimore Sun, 2017).

Going beyond a substitution level of integration with the technology, such as placing worksheets or books online in a digital format, teachers are increasingly asked to accomplish differentiated classroom goals and to meet the needs of students who are academically below grade level, using technology to advance achievement (Logan, 2016). A number of research studies that investigate teacher perceptions about the value of school technology show favorable outcomes (Zheng, et al., 2016). However, as these initiatives move beyond the initial implementation phase and into sustainability, little has been researched about how these perceptions may or may not change over time. Warschauer (2006) surmises that the effects of technology on instruction are better noticed, long term, when each student receives his or her own access in a one-to-one environment.

The first chapter of this study provides an introduction to the study that investigated English/Language Arts (ELA) teacher and principal perceptions of the value of one-to-one high school laptops in year 5 of the initiative in 3 urban high schools. It includes the statement of the problem, purpose of the study, research questions, a brief overview of methodology, definitions of terms, delimitations and limitations, assumptions, and the significance.

Statement of the Problem, Purpose of the Study, and Research Questions

Even with increased emphasis on 21st century learning and technology integration in high school settings, the 2013 Nation's Report Card shared that more than 64% of students in the United States ranked below proficient in reading by the end of high school

(National Center for Education Statistics, 2014). Districts are faced with the challenge of finding innovative ways to address poor achievement and the illiteracy of secondary students even as they appropriate more funding to increase technology in the classroom (Kaldenberg, Watt & Therrien, 2015).

Technology to enhance differentiated instruction, collaboration, and 21st century skill development will change (and is changing) student outcomes in settings with strong leaders and skilled teachers, and when value in one-to-one programs is found beyond just the test scores (Hartley & Strudler, 2007; Manchester, Muir & Moulton, 2004; Mills & Tincher, 2003). Understanding the perceptions of the stakeholders who implement the initiative is important because it contributes to the effectiveness of adoption and supports sustainability (Hartley & Strudler, 2007). The purpose of this study was to explore the perceptions of high school English/Language Arts (ELA) teachers and principals in 3 urban high schools as they implemented a one-to-one laptop initiative in year 5. The following research questions were asked:

- What are high school English/Language Arts teacher perceptions about the value of one-to-one student devices in year 5 of a high school laptop initiative?
- What are the perceptions of principals about the value of one-to-one student devices in year 5 of a high school laptop initiative?

Overview of Methodology

Qualitative research is "exploratory in nature" and involves collecting data to refine research questions and build theory, not to test a hypothesis (Hays & Singh, 2011, p. 5). Using open-ended interviews, this qualitative, exploratory study was conducted with 8 ELA (English/Language Arts) teachers and 3 principals at 3 urban high schools. All participants had been part of a one-to-one laptop initiative for at least 5 years. The interpretivist approach was applied as the paradigm for this research. Interpretivist

researchers believe the participant is the main knowledge producer and the researcher is detached as he/she describes practice. The goal of interpretivist research is to describe the participants' worlds (Koro-Ljungberg, June & Hayes, 2009). Since interpretivism sets out to understand (*"verstehen"*) human and social reality (Crotty, 1998), it was a good fit for understanding the perceptions of instructional technology's impact on student achievement.

Definition of Terms

One-to-one: One-to-one refers to a school instructional technology initiative that provides the same device to each student for use in the classroom as well as at home (Batane, 2002).

Perception: Perception is a way to understand or interpret.

Value: Value describes what someone judges to be important and of worth.

Student Engagement: Student engagement refers to the attention, interest, motivation, and passion for learning exhibited by students during class.

Student Achievement: Student achievement includes standardized test outcomes, course grades, and the development of soft skills.

Personalized Instruction: Personalized instruction in an approach intended to address interests and learning needs of students in an individualized way.

Initiative: A program started with hopes that it will continue and change practice is an initiative.

Limitations

This study was limited to three high schools and only investigated the perceived impact of classroom use of laptops that students can also take home (one-to-one). It did not take into account other classroom technologies such as laptop carts, smartboards, tablets, or bring-your-own-device (BYOD) programs. Also, only the perceptions of

selected teachers and principals were examined. Student, community, and central office staff perceptions were not included. This study took place in a large, urban public school district; therefore, outcomes may not be easily transferable to suburban schools, rural schools, or smaller school districts. No observations were conducted to confirm what was shared in interviews.

Unlike quantitative research, which allows the measurement of large numbers of people with limited sets of questions, qualitative research methods produce more detailed information about smaller numbers of people. This can reduce generalizability (Patton, 2002). It is possible to have a valid study, but it can be more subjective since it depends on the careful construction of instruments. Credibility in qualitative research hinges on the competence and skill of the person doing the study (Patton, 2002).

Assumptions

There were many assumptions associated with this study. First, it was assumed that all students had their own, campus-issued laptop device to use at school and at home for educational purposes such as organization, research, assignment submission, and to create projects. There was also an assumption that the teachers and campus leaders were truthful during interviews, and that perceptions would connect technology to something of value.

Significance of the Study

School laptop initiatives can help prepare students for their 21st century world (Donovan, et al., 2007). The Partnership for 21st Century Skills (2003) released a report advocating to better prepare students for the demands of their world:

> To cope with the demands of the 21st century, people need to know more than core subjects. They need to know how to use their knowledge and skills – by thinking critically, applying knowledge to new situations, analyzing information, comprehending new ideas, communicating, collaborating, solving problems,

> making decisions… As the world grows increasingly complex, success and prosperity will be linked to people's ability to think, act, adapt and communicate creatively. (Culp, Honey and Mandinach, 2005, p. 280)

As school leaders, school boards, and community members look for evidence showing the return on investment for educational technology, school districts typically look to standardized test scores (Warschauer, et al., 2010). This study examined principal and teacher perceptions of the value of one-to-one student laptops after year 5, to see which themes emerged that are related to the development of skills that may or may not be measurable by standardized tests. Information learned from these perceptions can inform future research in other school districts and can help to provide a rationale to increase or decrease technology in classrooms. The qualitative data gathered will lead to more questions that can be answered quantitatively. Strategies for professional development may be defined or refined from what was learned. The outcomes of this study might add to the overall body of knowledge on this topic and prompt further research related to these findings.

Summary

Research examining the impact of one-to-one technology on student achievement has been generally positive (Zheng, et al., 2016). This chapter gave an overview of a qualitative study that explored the perceptions of teachers and principals regarding one-to-one laptops in high school classrooms. After 5 years of such an initiative, this study aimed to determine if perceptions remained positive over time, or if they began to falter, as we have seen in the recent situation in Baltimore schools (Baltimore Sun, 2017). Through an interpretivist approach, open-ended interviews were conducted with teachers and principals to examine perceptions of the value of student laptops in the high school classroom.

Chapter 2: Literature Review

As one-to-one laptop programs in school districts have become increasingly popular, school leaders are looking for ways to measure the effectiveness and effect of the programs, including return on investment. The current affordability, availability of online access for students, and increasing need for devices to support online student assessment suggest that one-to-one laptop programs will continue to expand in school districts in the years to come. This expansion will likely encourage more studies about what works and does not work in school districts implementing one-to-one laptop programs (Zheng, et al., 2016).

Zheng et al. (2016) set out to synthesize the existing research on one-to-one laptop programs in schools through a meta-analysis at Michigan State University. They published their findings in late 2015. The focus of the meta-analysis was to examine the effects of one-to-one laptop programs on teaching and learning in K-12 schools (Zheng et al., 2016). They were not the first to do such an analysis. For example, Penuel et al. (2001) examined the research, but cited methodological problems in most studies that were reviewed. The University of Michigan study reviewed 65 journal articles and 31 doctoral dissertations before narrowing to 10 studies that were agreed to be valid. All studies published before 2001 were excluded from their analysis as was anything that was not peer-reviewed. Also excluded were studies about other types of technology (tablets, smartphones, or desktop computers); the focus was only on one-to-one laptop initiatives and did not include specific interventions that occurred within the laptop environment. The researchers looked for quantitative findings about the impact on students' academic achievement that included measurements from standardized assessments or norm-referenced tests. The meta-analysis findings showed positive results:

> Laptop environments are reshaping many aspects of education in K-12 schools. The most common changes noted in the reviewed studies include significantly increased academic achievement in science, writing, math, and English; increased technology use for varied learning purposes; more student-centered, individualized, and project-based instruction; enhanced engagement and enthusiasm among students; and improved teacher-student and home-school relationships…laptop computers have specific affordances that make certain uses and outcomes likely, such as the ease with which they can be used for drafting, revising, and sharing writing, and for personal access of information (Zheng, et al., 2016, p. 1075).

This literature review further investigates past and current research on one-to-one laptop initiatives that include leader and teacher perceptions, common concerns, and the roles the technology plays, and it briefly investigates the impact on student achievement.

Technology in Education

Even at the beginning of the computer age in K-12 education, many scholars, academics and researchers agreed that a device in the classroom was for more than just content and skill efficiency. Technology could help to create a more innovative learning environment that accelerates thinking. The National Commission on Education Excellence reported (A Nation at Risk) that all high school graduates should understand the computer as an information, computation, and communication device and be able to use one for personal and work-related purposes (National Commission on Excellence in Education, 1983). Similarly, and more specifically, the No Child Left Behind Act of 2001, Elementary and Secondary Act (ESEA, 2001) recommended that by 8th grade, all students should be technologically literate. With the encouragement of policy leaders and the belief that technology can better engage students and prepare them for their futures, technology in

classrooms has become one of the most hotly debated topics in education (Zheng, et al., 2016).

Early one-to-one initiatives. The one-to-one computer access movement began in the 1980s around the time of the Apple Classrooms of Tomorrow project (ACOT). This project provided one-to-one access to both students and teachers in the school setting. ACOT sought to "prepare classrooms for digital teaching and learning" (Donovan, et al., 2007, p. 264). The results of the Apple Classrooms of Tomorrow project highlighted that innovation adoption is a journey; teachers will change their teaching in technology-rich environments based on their own comfort levels with the technology. The project also found that staff development for teachers should "always match the level and current needs of the teachers" (Donovan, et al., 2007, p. 264).

In 1996, the Microsoft Anytime Anywhere Learning (AAL) initiative was another early example of providing one-to-one devices for both teachers and students. After 3 years of research, the findings showed increased "enthusiasm for teaching and learning with new technology, improved writing across grade levels, and a gradual shift toward constructivist pedagogies" (Donovan, et al., 2007, p. 265).

Not all who were part of the early work with school technology initiatives had positive perceptions or research findings. For example, Cuban openly spoke out against the impact of technology on classroom learning from as early as 1986 when he published "Teachers and Machines: The classroom use of technology since 1920".

> I do not know, for example, the collateral or unintended learnings that students absorb from working with computers. I worry that extensive classroom use of computers ultimately may corrode the teacher-student relationship, the social climate of a classroom, and the importance of students' learning to work collaboratively. (Cuban, 1994, p. 50)

Cuban went on to do further research in 2002 and shared that technology can be added to learning activities, but those activities will more or less remain the same (Cuban, 2003).

Modern one-to-one laptop initiatives in public schools. The state of Maine implemented one of the first large-scale projects to provide one-to-one devices. They deployed devices to every middle grade student (aged 13 to 14) in 2002. The devices were loaned to the students from the school, like a textbook (Zucker & Light, 2009).

In 2002, the Henrico County Public Schools (Virginia) district deployed more than 25,000 laptops to teachers and students in grades 6-12. The teachers reported that the laptops were a positive addition to their classrooms and shared that they "improved communication, self-directed learning, and student motivation" (Hartley & Strudler, 2007, p. 265).

Research on One-to-One Laptop Initiatives

Students in one-to-one environments have been observed to exhibit increased curiosity, excitement, and collaboration in the classroom. They have also shown a decrease in absences and behavior problems (DiGiorgio, 2003). Initial achievement results suggest that equitable access to technology and digital content may help close achievement gaps, but the larger gains are in classroom engagement and relevant instructional experiences (Batane, 2002). Devices in the classroom, in some cases, have been viewed as hindrances to teacher-student collaboration, when actually, in many instances, they have been shown to increase collaboration. Students are able to share documents, communicate with each other, and present their work more efficiently (Amirian, 2004; Bhave, 2002).

Student achievement outcomes of one-to-one initiatives. With all of the new technology in classrooms, it is interesting to note that the 2013 Nation's Report Card reported that a high percentage of students (64%) in the United States were ranked very

low in reading as they finished high school. This was a decline compared to previous years (National Center for Education Statistics, 2014). Researchers have advocated that literacy instruction should be the central part of core instruction in all schools (Kaldenberg, Watt & Therrien, 2015). This causes wonder about the one-to-one, K-12 campuses and their perception that the devices can increase student achievement and student engagement, especially in the area of literacy. Many studies that evaluate the impact of instructional technology on achievement suggest that the technology increases writing abilities and also increases student engagement, so students are more likely to graduate. When students have daily access to Internet-connected laptops, they conduct more background research for their writing; they write, revise, and publish more; they get more feedback on their writing; they write in a wider variety of genres and formats; and they produce higher-quality writing (Warschauer, 2006).

In 2008, Warschauer published a summary of findings from a multi-site case study involving 10 U.S. schools over a period of 2 years. The project investigated one-to-one laptop programs and literacy development. Findings showed positive benefits in the areas of scaffolding, student engagement, and increased time in text. Teachers reported that scaffolds such as online dictionaries, graphic organizers, and text-to-speech programs were beneficial with the technology (Warschauer, 2008). Even though online reading skills were not explicitly taught, they were embedded into assignments which required students to skim or scan online content to gather information and summarize main ideas. This was also true for other subject areas outside of English/Language Arts (Warschauer, 2008). In the area of writing, drafts completed on the computer were found to cause less fatigue compared to handwritten drafts. Teachers reported that responses or feedback were more efficient online and that students were able to collaborate more easily for peer reviews. Also, students could write for various audiences, including others far away. Littleton

Public Schools near Denver, Colorado actually used their one-to-one computer initiative to support writing, calling it "Inspired Writing". They deployed one-to-one laptop computers to support writing instruction to all ELA classes from 5^{th}-10^{th} grade (Warschauer, et al., 2010).

Interestingly, even though there were positive perceptions of literacy development with the devices, the Warschauer, et al. study did not show higher standardized test scores as a result. This could be attributed to the program's newness or that the teachers and students were still in the early adoption phase of the initiative. Or, this could be because of the misalignment of the standardized assessments and lack of multimedia literacy addressed by the test (Warschauer, 2008).

Other opportunities to use technology as a tool to address challenges in teaching and learning include using technology to:

> Deliver instruction to dispersed (geographically) audiences, to help students collect and make sense of complex data, to support more diverse and process-oriented forms of writing and communication, and to broaden the scope and timeliness of information resources available in the classroom (Culp, et al., 2005, p. 282).

Perhaps a disconnect in the link between laptop initiatives and literacy development is that the English/Language Arts community, for years, has not viewed technology as a learning tool. Many have resisted acknowledging it as a part of the English curriculum. Computer technology is typically viewed by this community as a tool for drilling or practicing basic skills or as a tool for word processing. If this mindset were to shift, it would allow English/Language Arts teachers to "engage students in conversations about modern technologies' impact upon what is at the heart of their subject matter – language, text, communication, literacy, and literacy practices" (McGrail, 2007, p. 60).

Successful implementation qualities. One-to-one laptop initiatives in schools will not be sustained unless change facilitators listen to and address the concerns of teachers. Unfortunately, teachers are rarely consulted yet are expected to quickly and positively adopt them (Richardson & Placier, 2001, Tyack & Cuban, 2000, Zucker & McGhee, 2005, Donovan, Hartley & Strudler, 2007). Successful implementation is rooted in understanding the concerns of those who will deliver the innovation (Donovan, Hartley & Strudler, 2007). Teachers change their classroom practices when they have aligned beliefs about the technology (Garthwait & Weller, 2015). Teachers will evolve from just using the computers for administrative functions and move toward lesson planning, research, and increased communication (Fletcher, 2004). Positive teacher attitudes have been shown to translate to "more frequent/efficient computer use and more positive learning environments", which supports the need for further study of teacher perceptions beyond initial initiative implementation (Maninger & Holden, 2009, p. 8).

In one-to-one laptop initiatives, the technology priorities must complement other factors like effective leadership (Culp, 2005). Successful one-to-one computing environments have committed leaders, appropriate financial priorities, technical support plans, and teacher voice in their own professional learning (Hartley & Strudler, 2007; Manchester, Muir & Moulton, 2004; Mills & Tincher, 2003).

Funding. Every high school dropout costs about $260,000 in lost earnings, taxes, and productivity. Over 6 million young people drop out each year in the United States (Annie Casey Foundation, 2014). If improvements in writing, student engagement, and student attendance are common themes among public school technology initiatives, then one would think that return on investment would be obvious and funding prioritized. However, school districts continue to have the challenge of allocating the necessary capital budget to start and maintain technology initiatives (Rhor, 2014). Some districts use federal

funds or grants while others rely on bonds to fund technology programs. Many school districts who did not have a proper plan for device repairs, replacement, and professional development have tried but failed at large-scale technology initiatives (Rhor, 2014).

North Carolina's Mooresville Graded School District has an approach to funding their laptop initiative that has become a model for other districts around the country (Rhor, 2014). They suggest 4 steps for budgeting a one-to-one program:

- Prepare for all expenses. There is more involved than just buying or leasing a device. Other costs include setting up wireless networks and servers and hiring technology staff.
- Find money through savings. There may be other positions in the organization that are no longer needed and can be repurposed. Eliminate or re-purpose textbook costs as the device may be able to replace them.
- Consider all funding sources. Look for state funds, philanthropic funds, bonds, and grants.
- Think of the long run. Build the costs into the district's ongoing budget.
- Plan for repairs. Repairs will be inevitable and should be planned for. Consider charging insurance fees to help cover repairs. An added benefit to charging the fee is that it also shifts responsibility to the students to be careful with the devices. (Rhor, 2014)

Training and support. Teacher professional development, planned with teachers and at the level of the teacher, has been an enduring theme highlighted in many reports as the most important part of a successful implementation (Culp, et al., 2005). When determining effectiveness of laptop programs, the pedagogical shift is more important than the actual technicalities of the technology. Teacher beliefs, leadership, classroom management, technical support, and professional development play important roles in the

success of implementation (Hartley & Strudler, 2007). Training, coaching, and time for practice is needed to support teachers as the traditional classroom shifts to a more student-centered approach (Hartley & Strudler, 2007; Mills & Tincher, 2003). In order for one-to-one to be successful, teachers must be given the space to try, fail, and take risks (Bitner & Bitner, 2002). When it is not about the device, but rather about the instructional pedagogy, and when a district is ready to invest in teacher training that prioritizes student-centered instruction, there is great value in a one-to-one program.

Teacher perceptions. In research conducted by Donovan, Hartley, and Strudler (2007), observations throughout the first year of a one-to-one laptop initiative in an urban middle school in the southwestern United States, revealed that several teachers rarely used laptops for teaching and learning. Some teachers did not feel proficient enough with technology to proceed with innovation. They would use the technology for things like word processing or internet searches. Some of their concerns included how they would find time to plan and meet their curriculum goals. In essence, teachers who were more traditional were being asked to adopt two innovations. They were expected to move to a one-to-one computing environment in addition to meeting the expectation of setting up a student-centered classroom (Donovan, et al., 2007). Teacher concerns were about the impact of technology on themselves, as individuals. Specifically, they were concerned about the impact on their own time, planning, and instructional practices. Other teacher concerns included how to best utilize the technology to promote routines, teacher effectiveness and collaboration (Donovan, et al., 2007).

In 2009, Maninger and Holden conducted a similar study of a middle school one-to-one laptop initiative in a private school district in a major metropolitan city in the southwestern United States. Findings from teacher interviews showed the following positive themes:

(1) Instruction is more engaging and accommodating: Students worked together more often and helped each other. Teacher participants in the study unanimously reported that the devices helped to address the needs of students with disabilities.

(2) Better access: Students could access more information and modes of communication than the teachers could have provided without the device.

(3) Improvement in instructional effectiveness: Some teachers had reservations about implementing the initiative due to their age or inexperience. The learning efforts were linked to the desire to do what was best for the students.

(4) Technology enhances learning: Teachers unanimously reported that the integration impacted instruction. The teachers also reported that they no longer had to be the supreme content expert of the classroom.

Overall, teacher perceptions were that the technology provided better student engagement, better independent and collaborative work, and improvements in problem solving. Also, staff development was well planned and aligned (Maninger & Holden, 2009). However, many teachers feared change during the early stages of implementation. Some may not be sufficiently motivated to create an environment where learning drives the technology use (Maninger & Holden, 2009). Some even perceive these technology expenditures as "oversold and underused", especially in situations where there is inadequate support. When they become frustrated by the lack of good models for planning and implementation, there is fear of not meeting students' needs. However, with additional time, experience, and training, efficacy of implementation will improve. Overall, the initial transition for teachers learning to integrate computers into their lessons happens more smoothly and quickly than most expect (Maninger & Holden, 2009).

In another study conducted by Lei and Zhao (2008), participants included students, teachers, and parents in a northwestern middle school in the United States. The study set

out to investigate the initial impact of one-to-one computing on learning and school climate. In this study, teachers were the most optimistic group. All teachers (100%) believed the laptops were valuable to students and themselves. There was, however, an expressed concern from teachers about their ability to enable students to select information found online.

Leader perceptions. In the research study previously mentioned, conducted by Donovan, et al. (2007), administrators were also surveyed. They reported concern with gaining better understanding of the program and about management of the innovation. Making sure there was adequate training for teachers was a great concern in order to ensure that the program was sustained for the future (Donovan, et al., 2007). Successful one-to-one implementation includes committed leaders who:

1) Communicate expectations and provide support

2) Prioritize resources for technology equipment, software, and training

3) Provide opportunities for teachers to have a voice in the implementation plan and to get a head start with the technology to become comfortable in advance

4) Provide a climate where all students have access and opportunities for use

5) Provide teaching models that ensure that the pedagogical shift is prioritized, with technological support

6) Monitor and evaluate program effectiveness

(Amirian, 2004; Burns & Polman, 2006; Dexter, 2007; Fletcher 2002; Goddard, 2002; Hartley & Strudler, 2007; Manchester, Muir & Moulton, 2004; Maninger & Holden, 2009; Mills & Tincher, 2003).

Unintended outcomes. While most research seems compelling about one-to-one laptop programs, not all research finds positive outcomes from technology integration in schools. For example, McGrail's study out of Georgia State University found that

English/Language Arts teachers reported negative outcomes in the context of laptop technology in their classrooms. The outcomes were social isolation, limited communication with teacher or peers, and off-task behavior. McGrail analyzed the teachers' classroom environments and engagements with the technology, since those behaviors represent teachers' beliefs about the role of instructional technology in the classroom. Findings showed that there were issues with classroom space, furniture, and technology infrastructure. The outcomes of the study provided suggestions to school administrators, encouraging them to address the physical constraints in classrooms and involve teachers more in professional development planning that puts pedagogy before technology (McGrail, 2007).

The US Department of Education reported that only 20% of teachers felt prepared to use technology in their lessons (Culp, et al., 2005). Other concerns about school laptop initiatives have been shared by parents. One-third of parents believe that their children spend too much time on laptops. Parents also report that they believe it is more difficult for their child to concentrate with a laptop because of distractions from the Internet, games, music, and email (Lei & Zhao, 2008). In a recent article by the *Baltimore Sun* (2017), parents describe their concerns about continuing the one-to-one laptop initiative in the district after year 4. Parents state that support for device repairs has been slow and has left many students without their devices to complete homework. Also, parents are concerned about the off-task behaviors that occur with the distraction of the device. The article briefly mentioned that teachers also share concerns about the accessibility of digital content for lessons. District officials countered the concerns with statements about the increase in positive outcomes for students since the inception of the initiative.

Technology as a catalyst for instructional change. "The image of technology as a catalyst for change is almost universally shared" (Culp, et al., 2005, p. 283). Technology

can spur other changes in the quality of the teaching and learning process, moving classrooms away from lecture-driven instruction and toward an inquiry approach. Donovan, et al. (2007) agrees but also provides a counterexample to the notion that computers are a catalyst for educational change and support a more 21st century learning environment. However, as easily as one could believe or state that the use of technology in the classroom encourages a shift to student-centered practices, one could also alternatively explain that one-to-one initiatives actually require the shift toward student-centered practices (Donovan, et al., 2007). Overall, teachers believe that opportunities for engagement with technology can motivate low-performing readers (Warschauer, 2008).

Summary

Research exists on the academic impact of one-to-one laptop initiatives in public schools (Zheng, et al., 2016). However, some meta-analyses have found that these studies vary in validity. A number of reports found better student engagement, student attendance, writing skills, communication, collaboration, personalized instruction, and 21st century learning skill development, while others have wondered about the long-term effects and sustainability of early gains in laptop initiatives (Baltimore Sun, 2017; Cuban, 2003; Donovan, et al., 2007; Lei & Maninger & Holden, 2009; Zhao, 2008). Teacher and leader perceptions were included in many of the existing research studies of initial implementation and may hold key information to make future initiatives more successful. Further study on teacher and leader perceptions should be completed in schools that have sustained one-to-one initiatives for a significant amount of time. This would show if, indeed, sustainability in technology integration improves with time and comfort level of the teacher and leader as previous studies have projected (Zheng, et al., 2016).

Chapter 3: Methodology and Procedures

The purpose of this study was to explore the perceptions of high school ELA teachers and principals in 3 urban high schools in year 5 of a one-to-one student laptop initiative. In order to understand how ELA teachers and principals perceived the value of one-to-one student technology and its potential impact on student achievement, the following research questions were asked:

- What are high school ELA teacher perceptions about the value of one-to-one student devices in year 5 of a high school laptop initiative?
- What are principal perceptions about the value of one-to-one student devices in year 5 of a high school laptop initiative?

This chapter describes the methodology and procedures of this study. Beginning with the purpose and research questions, this chapter also describes the methods, data collection protocols, research procedures, and data analysis activities.

Research Method and Design

Theoretical framework. A theoretical framework can be viewed as a thread that gives coherence to research all the way from the beginning to end (Hancock & Algozzine, 2017). "The theoretical perspective…is a way of looking at the world and making sense of it…embodies a certain understanding of what is entailed in knowing, that is, *how we know what we know*" (Crotty, 1998, p. 8). Since the interpretivist frame sets out to understand (*"verstehen"*) human and social reality (Crotty, 1998), it was an appropriate framework to apply to this study of understanding perceptions. Interpretivist frameworks describe the participants' worlds (Koro-Ljungberg, June & Hayes, 2009). Outcomes from interpretivist studies focus on the meanings made by others, in this case made by high school ELA teachers and principals. Interpretivism is a good theoretical framework for educational research, because it was developed out of genuine interest in the lives of people

in society who may not have much of a voice. In the interpretivist framework, the researcher is an instrument who conducts research through interviews, observations, or artifact analysis (Sessoms, 2007).

The grounded theory framework provided a template for this study. Grounded theory includes research methods that will offer explanations regarding perceptions of a population and how those perceptions are processed. Ultimately, grounded theory allows for the development of a theory or makes assertions as a result of a study (Bryant & Charmaz, 2007).

Need for qualitative study. Characteristics of qualitative research show that it is "exploratory in nature" and involves collecting data to refine research questions and build theory, not to "test a hypothesis" (Hays & Singh, 2011, p. 5). Due to the nature of this study, and the priority to seek understanding of individuals' perceptions, qualitative research was the best fit. The need for a qualitative study on this particular topic was due to a need to conduct interviews in order to understand perceptions of teachers and principals after a laptop initiative had moved past the initial implementation phase.

While quantitative research approaches allow measurement of large numbers of people with a limited set of questions (which allows for comparison and data aggregation) and give broad findings, qualitative methods also produce detailed information about smaller numbers of people. This increases the depth of understanding, but it "also reduces generalizability" (Patton, 2002, p. 14). Validity is possible, but more subjective as it depends on "careful instrument construction to ensure the instrument measures what it is supposed to measure" (Patton, 2002, p. 14). The researcher is the instrument in qualitative research, so "credibility hinges on the skill, competence, and rigor of the person doing the fieldwork" (Patton, 2002, p. 14). Sometimes qualitative educational research is subject to criticism from those who favor a more quantitative or scientific model of research. This is

mostly because of the argument that qualitative research is "too subjective or too much based on feelings and personal responses". Even though critics may not favor this as reliable data in the same sense they do numbers and percentages, there is not much that educational researchers can do about this since "by nature, education is concerned with human beings…human beings are not predictable or static in the same way that inert materials or fixed numbers are" (Hancock & Algozzine, 2017, p. 20).

This study was conducted following the exploratory design. It focused on gaining insight for later investigation and established an understanding of how to best proceed in studying this topic. It generated new ideas and developed tentative theories. Because exploratory studies generally utilize small sample sizes, the findings are not generalizable to larger groups and do not provide finite conclusions. Flexible processes allowed for authentic responses from participants.

Population, Site, and Sample

Two levels of selection occurred in this study. First, the 3 school sites were selected based on the following criteria:

- High schools of grades 9-12
- At least 5 years of participation in a one-to-one student laptop initiative
- The same principals for all 5 years of the initiative
- At least 3 ELA teachers per campus who have taught in a one-to-one classroom for at least 5 years of a one-to-one initiative
- Part of the same large, urban school district (over 100,000 students)
- Campuses meet the satisfactory standard on the annual state-wide accountability system
- School infrastructure for wireless Internet extends throughout the entire school building

- Teachers trained with the laptops prior to initial student deployment

Only 3 campuses fit this criteria within the only nearby large, urban school district in year 5 of a one-to-one initiative. The 3 campus principals were invited to participate through purposeful selection, and all accepted. All eligible ELA teachers (lists of eligible teachers were provided by the principals) at each campus were invited to participate. Out of the 10 teachers who fit this criteria at the 3 campuses, 8 volunteered to participate (3 teachers from 2 of the campuses and 2 teachers from the remaining campus). Age, gender, years of experience, or grade level taught were not part of the criteria for selection. Tables 1 and 2 show general information about principal and teacher participants in this study. Pseudonyms are used for each teacher and principal participant to help guarantee anonymity.

Table 1

Principal Participants

Participant	Campus Description	Number of Years Leading One-to-One	Total Years in Education
Kristy King	Enrollment: 700+ 58% Hispanic, 22% African American, 15% White, 4% Asian, 1% Other 63% Economically disadvantaged STEM-magnet School	5 years	26 years
Logan Livingston	Enrollment: 3,000+ 45% Hispanic, 19% African American, 20% White, 13% Asian, 2% Other 59% Economically disadvantaged	5 years	26 years
Quincey Robinson	Enrollment: 3,000+ 85% Hispanic, 10% African American, 1% White, 4% Asian 69% Economically disadvantaged	5 years	23 years

Table 2

Teacher Participants

ELA Teacher Participant	Principal	Total Years Teaching	Number of Years Teaching in One-to-One
Mona Smith	Logan Livingston	18 years	5 years
Dana Brown	Logan Livingston	13 years	5 years
Leon Nichols	Logan Livingston	29 years	5 years
Jada Campbell	Quincey Robinson	14 years	5 years
Luke Fox	Quincey Robinson	14 years	5 years
Page Rogers	Kristy King	6 years	5 years
Pat Compton	Kristy King	19 years	5 years
Dawn Grady	Kristy King	10 years	5 years

Data Collection

The data collection method consisted of interviews with open-ended questions. Open-ended responses allowed the researcher to understand the world as seen by respondents. Gathering responses from open-ended questions also allowed the researcher to understand and capture points of view from participants without "predetermining" the responses through pre-set questioning categories (Patton, 2002). The researcher gathered direct quotations that gave raw data and revealed respondents' emotions, thoughts, experiences, and basic perceptions. Guiding questions were provided to participants in order to help organize the system and allowed participants to respond in thorough and accurate ways (Patton, 2002). The instrument used for data collection can be found in the appendix.

Interviews, utilizing open-ended questions, included a template to gather themes and quotes from ELA teachers and principals about their perceptions of the success of the one-to-one laptop initiative.

Interviews are a frequently used method for collecting qualitative data in educational research…they allow us to engage with our research participants individually face to face in a way that questionnaires or focus groups, for example do not…they are a very flexible research tool which can be used to gather a range of different types of information… views and opinions…which makes them useful as a means of answering a wide range of research questions. (Hancock & Algozzine, 2017, p. 85)

Researchers caution that the use of interviews as the tool for research could draw conclusions or construct theories that come down to a subjective interpretation (Patton, 2002). Therefore, open-ended questions were posed in a way that aligned to the research questions about perceptions, value, and classroom technology and allowed for participants to share thoughts without too much specificity guided from the questions.

Data collection procedures. In order to protect the anonymity of participants and the schools, and to ensure that the research plan was approved as sound, permission was obtained from the Institutional Review Board (IRB) at the university. Upon IRB approval, further permissions were granted from the school district's research department as well as the principals of the high schools. All data collected were kept by the researcher in a digital, password-protected file.

Beginning late summer 2018, individual interviews were scheduled with each participant. Each interview lasted approximately 30 minutes and consisted of 13 open-ended questions about how technology is used by teachers and students, what has changed since the technology initiative began, and what specific examples exist that show positive or negative value of one-to-one student devices in the classroom. Over the course of three months, qualitative data was gathered and coded from the interviews that were conducted at each high school.

Data analysis procedures. Qualitative data from open-ended interview questions was gathered and coded from 8 teacher and 3 principal interviews through notes and audio transcribing from recorded interviews. Common themes for each group were identified through open and axial coding to narrow consistent ideas that emerged from interviews (Hays & Singh, 2011).

The Grounded Theory Method (GTM) encouraged the researcher to have persistent interaction with the data and become regularly involved with analysis. The process of moving back and forth between the data and analysis ensured that the data was more focused and analysis more theoretical. Because GTM was applied to the analysis procedures, the researcher did not utilize a third party for coding. A personal device (with a password lock) recorded the interviews and the researcher analyzed for themes herself using a macro in Microsoft Word.

Researcher positionality. The researcher's belief is that technology can be a distraction to rigorous teaching and learning but can also be a powerful tool for differentiation. The researcher acknowledges personal bias in this study and used multiple strategies to bring trustworthiness to the outcomes of the research. These strategies included the following:

- Reflective journals – A log was kept of experiences, observations, thoughts, and responses to what was learned.
- Peer debriefing – The researcher confidentially debriefed with peers throughout the study for feedback, support, and mentoring.

The researcher acknowledged the need to protect the study from personal interference. She listened to data and reported on what was heard as directly as possible, with no additions that were off script. "The important thing is to acknowledge those values which include our attitudes, principles, beliefs and prejudices, and which may be

acknowledged by us or invisible to us as influencing aspects of our research and to be self-reflexive in our research" (Hancock & Algozzine, 2017, p. 2).

Summary

Qualitative methodology with an interpretivist approach was applied to this study in order to investigate perceptions of ELA teachers and principals. Open-ended questions were asked during interviews with 8 teachers and 3 principals over the course of three months. Grounded Theory and GTM were applicable, because a theory was generated from this exploratory research study. The researcher engaged with the data analysis through GTM methods as themes emerged from interview transcripts. Personal bias due to positionality was noted and was addressed through journaling and peer debriefing. The next chapter describes the findings and themes that emerged from this study.

Chapter 4: Research Findings

Under the assumption that there is value in having one-to-one student laptops for teaching and learning in high school classrooms, this study explored the perceptions of 8 high school ELA teachers and 3 principals in a large, urban school district after 5 years of a one-to-one student laptop initiative. While some prior research exists into the value of one-to-one, little research about teacher and leader perceptions has been reported after such an initiative has sustained itself. For this study, interviews were conducted with open-ended questions and prevailing themes were discovered through emergent, open, and axial coding to determine whether perceptions of one-to-one technology value are similar to existing research or have changed over time. Outcomes of this study can inform the work of school district leaders as they decide to increase district technology, determine professional learning priorities for teachers, or plan for sustainability of current technology initiatives. The outcomes of this research may also determine other research topics that should be investigated to add to the body of research in this area. The following research questions guided this study:

- What are high school English/Language Arts teacher perceptions about the value of one-to-one student devices in year 5 of a high school laptop initiative?
- What are principal perceptions about the value of one-to-one student devices in year 5 of a high school laptop initiative?

Findings from qualitative methodological procedures will be discussed in alignment with the research questions in the following sections.

During the analysis of interview transcripts, there were 15 emergent codes that were discovered. A generalization of the findings occurred which produced open codes, and then axial codes persisted as relationships were determined among the findings. Table 3

shows the initial emergent codes. Table 4 shows a summary of the overall teacher and principal themes of the findings.

Table 3

Emergent Codes from Teacher and Leader Interviews

Emergent Codes
Writing
Reading
Presenting
Organize
Editing
Real-world connection
Feedback
Google
Professional learning
Resources
Access for all
Easier
Search
Edit
Practice

Table 4

Themes from Teacher and Principal Interviews

Major Themes	Teacher Theme, Principal Theme, or Both	Keywords
Higher-Level Learning	Both	High Levels, Increase, Academics, Learning
Equality in Access	Both	Access, All Students
Access to Digital Resources	Both	Resources, Programs, Websites, Tools
Access to Google	Both	Google
Collaboration	Principal	Collaborate, Group, Together, Feedback
Writing	Teacher	Write, Edit, Revise, Draft
Efficiency	Teacher	Efficient, Streamline, Ease, Easier
Searching	Teacher	Search, Find, Look

Research Question 1: Teacher Perceptions

Seven out of the 8 teachers who were interviewed had generally positive demeanors when asked to discuss their experience with one-to-one laptops for education. However, even the teacher who was somewhat negative about the topic agreed with the other 7 that one-to-one laptops for students are worth the investment. Through general, open-ended questions, 5 common themes emerged across all teacher responses. First, a potential for higher-level learning was unanimously supported in data gathered from teacher interviews. Secondly, all agreed and mentioned that one-to-one technology provided equal access to students. Specifically, this included access to digital resources such as web tools, web

sites, district-purchased resources, or the most common response, Google. Another theme that was common across all teacher responses was the topic of writing, which included revising, editing, citing sources, gathering and giving feedback, and publishing. Efficiency was the fourth theme, which referred to the way that technology makes the lives of teachers and students easier by organizing information, dates, assignments, passwords, and grades. Searching for information was the final common theme.

All teacher interviews were conducted with high school ELA teachers who have taught in one-to-one student laptop environments for 5 years. Teacher experience ranged from 6 years to 29 years in education. Teacher participants seemed eager to reflect on their experiences and volunteered to participate in interviews. All teachers at the 3 chosen campuses who fit the criteria were invited to participate. All who accepted the invitation were able to participate. Of the 3 campuses included in the study, 1 had 2 teacher participants and the other 2 campuses had 3 teacher participants each. Table 2 in chapter 3 described an overview of the teacher participants and their assigned pseudonyms.

The idea that technology prepares students for their futures was mentioned by most teachers, but not all made reference to this as a key value of the one-to-one initiative. Also, most teachers discussed professional learning experiences; however, this did not connect directly to the purpose of this research, which was to determine the existence of perceived values. Device care and access to wifi at home was regularly discussed throughout the teacher interviews. Most teachers explained that they were surprised to see that some student groups had not taken adequate care of their devices over the years. However, most teachers agreed that the majority of their students are benefitting from the district-provided wifi services at home. Some even mentioned that home access to wifi "levels the playing field" for students to have equality in access. Other themes that emerged from the interviews may be considered for future research. For the purpose of this study, only the

themes that represent perceived values of all teacher participants will be discussed in detail, beginning with the unanimous theme of "higher-level learning".

Higher-level learning. All 8 teachers unanimously agreed that the one-to-one program is worth the investment. They all seemed to also agree, to some extent, that students may learn at higher levels in schools with one-to-one devices. However, not all agreed that it is simply the device that is causing this to occur. For example, Ms. Campbell believed that the device has a direct impact, "because an entire world is right there in front of them."

When asked about what evidence proves there is higher-level learning, not all agreed that standardized tests were the best measure. Some, like Ms. Rogers, did not have an answer when asked how one could measure higher levels of learning without a standardized assessment: "I'm not sure how you would measure that."

Ms. Grady explained how to see evidence of higher-level learning:

> I know – talking to other colleagues at other schools – it's because our kids were exploring, and they saw what other people were doing on the Internet. And through their research, they learn what other people are doing. "I see what you're doing, and now I can add this layer." And so, I think it adds peer pressure in a positive way to showcase their work.

Ms. Brown described how to know students are learning at higher levels by giving an example, "I would base that on just what they are able to produce within interpretations and connections that I would never…have made as the subject matter expert in the room."

Ms. Grady reiterated that students can learn at higher levels but added that just giving a computer to a student does not ensure this happens: "I think they can. I don't think that just giving a kid a computer means that they're learning more."

Most teachers said they believed that higher-level learning would eventually translate to higher academic gains on standardized tests, but they also communicated that they don't hold standardized tests scores as their primary self-evaluation of effectiveness or to review which programs or curriculum drive their classroom instruction. Overall, teachers communicated that higher-level learning may be occurring but was measured through their own methods such as classroom observations and review of the quality of student work. Table 5 shows an overview of teacher participant responses regarding higher level learning.

Table 5

Teacher Finding: Higher Level Learning

Participant	Responses
Mona Smith	"They (students) may not master a particular lesson, for instance, just like that. But, the thinking, they're constantly thinking and looking and searching and I think those are very basic skills to survive in the world." "And it's up to us, I think, to guide them (in the use of technology), I believe, to guide them through that process… if it helps their standardized test scores, the better. But I can't tell you that there is a correlation that I know that I've seen that laptop use has had an impact on standardized scores."
Dana Brown	"I think that they are learning, as I said, more at the level of synthesis. And I would base that on just what they are able to produce within interpretations and connections that I would never would have made as the subject matter expert in the room."
Leon Nichols	"(Standardized test) scores are so fluid. You get one good group and you get a tough group. So I don't ... I mean, their scores are good here. They went up six points last year, hooray. They might go down three points next year. Who knows, right, depending upon the group. I just think that if the computers in the classroom help teaching, then it's gonna reflect on the scores. I mean, it has to. Because testing is such a cumbersome, illogical at times...I mean, you have a good group that scores really high, because they're just a good group of kids. And then the next group are harder. You have more Special Ed, more ESL kids, and so they struggle more. I just think that if the laptops in the

(Table 5, cont.)

	classroom change my teaching and help with the kids, then I'm sure it would reflect. But I couldn't say, on a graph, this shows that."
Jada Campbell	"An entire world is right there in front of them. I always tell them, use it for good but anything they need to know, like there's no wander, there's no curiosity that goes unchecked because…I think that more students are willing to put in leg work. I'm not really sure how I measure (higher level learning)."
	"We have classrooms full of kids that may not excel at (standardized testing) but that doesn't mean that they aren't incredibly gifted. So my measurement for success is usually like my own type of benchmarks or even district benchmarks that don't necessarily always match exactly what's going to be on the test. These kids, they learn so many different ways and then the test only gives them this way to measure so it's kinda like that meme where if you have the elephant and mouse and you're expecting them both to reach the tree the exact same way."
Luke Fox	"Interest feels better…just more like kids going, oh, this is fun, this is neat. This computer feels modern and high tech, not like a musty old book."
Page Rogers	"Some kids…they're gonna use the technology right to help them have more questions and have that higher level that they need…I think it really just depends on the kid. I'm not sure how you would measure that."
Pat Compton	"Higher to me it's hard to qualify, very different. It's a very different modality I think to learn this way. So I don't know that I .. I think that some things are diminished. They can't memorize anything to save their life. I don't know that you need to memorize anything anymore. But if given that task, that ability is gone. But, that said, what they can do with this (technology) as an extension of them."
Dawn Grady	"I don't think that just giving a kid a computer means that they're learning more. I think it's a conscious effort of using that computer in ways that are conducive to achieving more. I think the evidence that I have here, especially with our projects, I mean we shoot really big, we have these really big questions for students and even though we have rubrics and say these are the components of the project, it never fails that every group through their research finds a way to one up even what our expectations were. And I know talking to other colleagues at other schools it's because you have good kids, and I don't think it's that. I

(Table 5, cont.)

	think it's that because our kids were exploring, and they saw what other people were doing, and the internet, and through their research they learn like other people are doing this, I see what you're doing, and now I can add this layer. And so I think it adds peer pressure in a positive way, to showcase their work."

Access. All teachers shared in their interviews that one-to-one technology was valuable in providing equitable access to students. Because each student has his/her own device, and they are all the same devices, student access is equal for classroom activities. In addition to generally more equitable access, all teachers also described the access to resources, especially Google, when sharing their thoughts about this value.

Ms. Rogers explained that many students had not been exposed to technology until they received their device at school: "Last year we had some kids come in, and it seemed like they had never touched a computer before. They didn't know how to turn it on, they didn't know how to start it, how to log in, and it seemed like that was a struggle for a good week."

Ms. Brown had similar comments and also stated that the devices "are leveling the playing field in terms of getting students who don't have the financial resources to have this technology at home comfortable with the environment that they'll need to be successful professionally and in college."

Mr. Fox specifically mentioned English Language Learners: "I think laptops really helped them with more resources… I like the way they customize their laptops so they get everything in, say, Spanish or their language. So, they've got that support, which is really good. I think it's helped them a lot."

Prior to one-to-one, the teachers discussed their struggles in providing devices for all of their students at school during classroom activities. Some students had their own,

many did not. Other students may have been accustomed to iPads, but those were difficult to use when producing work products. With each student having his/her own device in the district-led one-to-one laptop initiative, teachers reported that barriers to technology integration were removed in daily instruction.

In addition to the teacher perceptions that one-to-one provides equal access to all students, all teacher participants referenced, specifically, that accessing digital resources is a key value that one-to-one technology brings to teaching and learning. Online resources such as Kahoot, Nearpod, Khan Academy, Achieve 3000, EasyBib, and turnitin.com were all referenced, among many others, as being tools that offer students ways to stay engaged, study, practice, and access enrichment activities. Teachers commented that digital resources also allowed them to monitor individual student learning. Ms. Smith said, "they can see these (diverse materials) and they can study them on their own or they can ask, you know, questions and if they do, well and good for them." Ms. Rogers said the resources are a "strength" and further described the role of the teacher in deciding what to use:

> There are a good amount of resources available to us. For our campus specifically, because we do project-based learning, we don't always follow a scope and sequence, so the resources can be useful for us, but we have to kind of go through and decide what we're going to use.

Differentiation, personalization, and individualization were mentioned inconsistently by teacher participants, who described digital resources as being helpful to meet the varying academic needs of students. Some students could work ahead, study in different ways, or practice mini lessons to support upcoming units of instruction.

One particular resource, Google, was mentioned the most in teacher interviews. Twenty-three times, to be exact. Ms. Brown believed that students have become comfortable with the Google programs:

> I think that a lot of our students have migrated to being really comfortable with the Google suite of products…things that allow them to produce their own work. They seem really confident and comfortable with Slides and Docs, and I guess sometimes Sheets. But they have everything organized. They kind of have their life in there.

Mr. Nichols compared the use of Google to the district-provided learning management system (LMS):

> Everyone uses Google Classroom because you can use it. The (LMS) is…you have to do 14 things before you can post a lesson. Whereas, in fact, I'm posting stuff right now on Google Classroom. It's like, hit it, label it, upload a video. It's very, very user-friendly and intuitive.

Ms. Compton also shared experiences with lessons in Google:

> What I do is what I call an interactive reader. So everything that I do, I've put it on a Google Doc, like it's a webpage. So, here's our entry event, here's our pre-reading, here's our reading. And then there's click outs for everything as they go through it. Plus they can record their answers on it and then submit that to the (LMS). So, it's always just a multisensory experience with me.

Ms. Smith discussed how Google is used for lessons, specifically group work, and described using Google Slides by creating a template and assigning a slide to each student to work on simultaneously. The value, according to Ms. Smith, is that students can look at each other's slides for ideas or to give feedback. Ms. Rogers also spoke positively about the way feedback can be given through Google Docs. Table 6 describes responses from teacher participants regarding the value of one-to-on in providing access to students.

Table 6

Teacher Finding: Access

Participant	Response
Mona Smith	*Equality in Access* "Considering that they have in their in fingertips a tool that they see most people use outside of the school. I mean, they see it's all around them, you know. There's a professional with a laptop there. And there's what is a straggler, you know, in maybe a fast food restaurant that's using a laptop. It's something that it kind of like sort of creates a sense of belonging for them because they have one like everyone else as well." *Access to Digital Resources* "There are several apps where you just give them a pin and they can be there… Kahoot!, for instance. Even Nearpod. I love Nearpod. Nearpod is such a neat tool that is does a lot of things for me." "In the classroom, obviously, we use them (laptops) quite a bit as far as like, say for instance, Vocabulary.com. My assignments in Vocabulary.com is not only limited to the classroom. If they have a downtime here, they can work on it. But then if they don't, if the only place they can work on it is at home, it is actually a homework for me because I give it once a week and then there's a deadline at the end of that week. So that means, say, they have all the time in the world to work on a Vocabulary.com assignment." *Access to Google* "Just seeing the kids get excited about something like one of the collaborative work that I make them do is Google Slides. It's like for every slide, I've already prepared it, this is for Alejandra. This is for John. This is ... So each slide, they can only work on their slide. They write their poem. They design that slide according to how they want it. And then they see, you know, each other's work and even if we don't get to the part where we would present it in class, they've seen it already." "Everything in Google Actions is perfect. From Google Slides to Google Docs because it is collaborative. They're able to collaborate with each other because of that. Even in Google Classroom."
Dana Brown	*Equality in Access*

(Table 6, cont.)

	"It levels the playing field in terms of getting students who don't have the financial resources to have this technology at home comfortable with the environment that they'll need to be successful professionally and in college. That kind of thing. Even the students whose families can afford to buy them their own laptop, I think the vast majority of our kids choose to have the school laptop. So it's just kind of cool that everyone has the same experience and knows the same applications and how things work."
	"If they don't have that (technology), they are losing out, they are going to be behind the game. They are going to be at a disadvantage, not only academically, but just socially and emotionally. This is the form that we use for the business of our lives."
	Access to Digital Resources "I wish I had learned about some tools earlier. I, over the last year, really embraced turnitin.com and actually we just found out today that we are going to get to have that renewed. It looked like we weren't going to, and I really felt the loss of that, because it's not just a plagiarism check, it's a whole system for organizing students' papers, responding to students in efficient and effective ways."
	"So, for the most part, a lot of the things that we do as English teachers, I think technology will never really be able to say, "that was a thoughtful and creative interpretation of a novel." But it can help us with somethings like correct grammar usage, vocabulary building, that kind of thing. And so by giving students exercises through Vocabulary.com, Khan Academy, NoRedInk, that kind of frees me up to spend more of my brain space and my time on things that I think software will never be able to do."
	Access to Google "I think that a lot of our students have migrated to being really comfortable with the Google suite of products…the things that allow them to produce their own work. They seem really confident and comfortable with Slides and Docs and I guess sometimes Sheets. But they have everything organized. They kind of have their life in there."
Leon Nichols	*Equality in Access* "I was just grateful 'cause a lot of our kids may have their own (device) and have their own stuff. But a lot of our kids ... Some of our kids didn't even have an email address when they got here."

(Table 6, cont.)

	Access to Digital Resources "I've been able to personalize lessons using some of the Khan Academy and Achieve 3000 and some of the other things to multi-task, differentiate the tasks for the different students. That's been helpful." "The sharing of tasks, which they did before, but just in a different way. And everyone pulls up EasyBib at the same time and we're gonna add all our citations. Cooperative learning on a digital scale, it's been fairly seamless for the kids (with digital tools)." "Access to information has streamlined ... And just the MLA format, it's streamlined all that. So I can do a good bibliography on EasyBib. I can get MLA format on Microsoft Word. Now I can focus on ... And I can do parenthetical references. It does it all for me. Now I can focus on what I'm saying, not so much the paint. It's the house, not the paint anymore." *Access to Google* "Everyone uses Google Classroom…in fact, I'm posting some stuff right now on Google Classroom. It's like, hit it, label it, upload a video. It's very, very user-friendly and intuitive." "And they all get onto Google Docs and share their stuff and edit each other's things. And it's like, "Wow. This is really impressive." because it would take me a while to do it. I see them being able to do the things that they're gonna need to do if they have a professional job. Sitting around a table with pencil and paper is over. Everyone's got their laptops open."
Jada Campbell	*Equality in Access* "Accessibility, I just remember when I was in high school, and middle school, we purchased our novels. And I know that's not really feasible to a lot of our students for me to say 'Hey, we're reading Catcher in the Rye, your assignment is everybody comes back with a copy of that'. But now that we have the laptops, you're going to have students that are going to choose to go out and buy a copy, get a few of those kids that then can say, can't do that or don't want to do that, they're excited because they can just get a copy of it online. And then that way, they always have it as well. And if I have a class set, I'm not going to check my class set out to the kids, but they know when they leave this room, they still have that novel with them in their computer."

(Table 6, cont.)

	"Students that are just struggling readers…like when we use the (accommodations program), it's like there's something there and you can put that text into the program and now everybody is capable of understanding the material." "Making sure that all students have the same accessibility to the text. That helps, like there's a lot of kids that are like super shy, so they don't want to talk out loud in class but then when you put it online, they're able to have that discussion with everyone online." *Access to Digital Resources* "At the very beginning, I wish I would have known all of the resources that were available. Because, at the beginning we had to lock the laptops, but we still had all the textbooks in the corner, to kind of supplement what we didn't have. But, turns out, it was all there. And next year they started adding more stuff. I wish I would've known all of the resources beforehand." "And then you have so many resources you really don't know which ones, you don't really know how to implement your favorites. And you're like, am I missing something? Or, am I making the kids miss out on something? Because, I just don't have time to implement everything that we've been given. So, I like the fact that there's a plethora of resources." "We use vocabulary.com, NewsELA, Quill, things like that. I use those as a routine. Something that's gonna help them with their grammar, their vocabulary and also keeping up with current events and we pretty much do that weekly. I know this year, we have to implement Khan Academy and Achieve3000, so we're trying to figure out how we make sure that they do all of those, and then they still get face time too. That's a lot." *Access to Google* "And working on implementing Google in the classroom and finding out that Google had all of this stuff available. Pretty much anything you could possibly think of there, is like a Google app for it…those are really helpful."
Luke Fox	*Equality in Access* "I like the way they customize their laptops so they get everything in, say, Spanish or their language. So, they've got that support, which is really good. I think it's helped them a lot."

(Table 6, cont.)

	Access to Digital Resources "We have a lot of websites, I'm gonna call them automated websites, that help students learn something, like Khan Academy or Achieve3000, which are great tools. And the websites can analyze how the kids are doing and give them new challenges." "I think the laptops really helped them with more resources." *Access to Google* "But we can't say with certainty that every student graduates with knowledge of how to use MS Office and Google Docs. And it would be nice if we created some kind of competencies, like I said, and then scaled it for each grade."
Page Rogers	*Equality in Access* "Like last year we had some kids come in and it seemed like they had never touched a computer before. They didn't know how to turn it on, they didn't know how to start it, how to log in and it seemed like that was a struggle for a good week." *Access to Digital Resources* "We just had turnitin.com. I feel like a lot of digital platforms provide convenience for the kids and for the teachers for grading. Certain platforms, like turnitin.com, we can use a really cool rubric that either we upload or we can pull from other places and it makes grading really streamlined." "There are a good amount of resources available to us. For our campus specifically, because we do project based learning, we don't always follow a scope and sequence, so the resources can be useful for us, but we have to kind of go through and decide what we're gonna use." *Access to Google* "Provide feedback to kids, it can be live feedback through Turnitin or through Google Docs. Peer feedback, which is super useful, because sometimes it's helpful for students to be able to read something that a peer says because it's oftentimes more in their language than it would be for a teacher or from a teacher."
Pat Compton	*Equality in Access* "Giving the kids the computer in their hand also is something that they might not have experienced until they went to college. So they might've had to go to a lab or go somewhere to even like...something as

(Table 6, cont.)

	simple as type a paper. So now, the fact that we can create a digital experience for them, and we're really pushing this year blended learning here, is great. And we can put the remediation in there side by side with the extensions and it'd be one lesson and teach it. We do, I call it, one room school house here."
	Access to Digital Resources "Because the revision tools, the fact that we can use turnitin.com for the plagiarism checker, but also use it for peer editing."
	Access to Google "So the things that I remembered specifically were like some extensions that you can put on Google that I didn't know about, just very, very specific things that are higher levels of learning in computers, I think, would be great to have more…everything that I do, I've put on a Google Doc, like it's a webpage. Here's our entry event, here's our pre-reading, here's our reading. And then there's click outs for everything as they go through it. Plus they can record their answers on it and then submit that to the LMS."
Dawn Grady	*Equality in Access* "I think that leveled the playing field. Because, we had some kids that were just really working straight through lunch, never taking a break to maximize that time."
	Access to Digital Resources "Teachers need to learn how to be a curator of content, whether that's the text your bringing in, and a lot of my teachers, especially some newer to teaching, really struggle with choosing, appropriate, not their choosing inappropriate text, but looking at online articles and understanding what is a challenging piece for kids and what's not. I think a textbook did that for you. A book you can pull the lexile, but really understanding, understanding online mediums and understanding what resources you bring in."
	Access to Google "We do like Google Classroom. There are some of us who are still using that a little bit more, it's a little bit more streamlined."

Writing. All teachers discussed writing when asked about the value of the one-to-one devices in their classrooms. This included references to word processing, blogging, revising, editing, citing sources, and publishing. Ms. Brown believed that the laptop makes students write faster and also makes them eager to write more. Ms. Smith agreed: "They're writing more because they like it."

Ms. Compton spoke generally about writing: "The writing process is obviously, I think, a given because the revision tools, the fact that we can use a plagiarism checker, but also use (the device) for peer editing. You can use it for feedback and rubrics and those kinds of things. So that's really great."

Ms. Grady said it was useful for "not just the writing process, but modeling writing and finding evidence is really helpful, and then extension and remediation activities." Additionally, Mr. Fox stated that students have an increased likelihood of writing more with the laptop: "A lot of our kids might dislike writing because it hurts their hand. So, when you're typing something, it feels like that's less writing, and you might get more out of that kid because it doesn't hurt."

Ms. Brown summed up this theme in a way that represented many of the views of the other participants:

> Just word processing fundamentally changes the nature of what we are doing. A lot of our instruction around writing and revision and planning kind of operates under the assumption that you are writing something by hand and going back and changing something, editing something, as you are writing. If you were doing that on a sheet of notebook paper, you have to erase everything, you lose what you have written. And so it's really changed how I instruct students to put together their thoughts in writing.

Table 7 shows further response details from the teacher participants regarding writing.

Table 7

Teacher Finding: Writing

Participant	Response
Mona Smith	"They're writing more... and you see them erase each other's stuff. "Not like that." And at the same time talking, "Not like that." And so, someone's typing something. I mean, you know, it's not always perfect."
Dana Brown	"A lot of our instruction around writing and revision and planning kind of operates under the assumption that you are writing something by hand and going back and changing something, editing something, as you are writing. If you were doing that on a sheet of notebook paper, you have to erase everything, you lose what you written. And so it's really changed how I instruct students to put together their thoughts in writing." "Allowing students to work together on a document, to write something with a partner or in a group has been really powerful. And honestly, some of the best writing that I've gotten comes from when they're all together and they're the most critical reviewers of each other's work and will really say, "that piece just doesn't work," or "that evidence is ridiculous." "I do think they're writing more. I think that it's not always the formal writing that we see, but it's easier. You can write faster. Your writing is saved."
Leon Nichols	"And having a thesis statement, and having cogent paragraphs that develop an idea, and a bibliography that makes sense (with technology)."
Jada Campbell	"When I had all seniors, we did everything online, from journaling to essays. We kinda backed away from that during the year that I taught English 2, because at that time, the English STAAR, they weren't online, and so the focus was getting them to focus on writing 26 lines. But now that it's back online, hey we're back. Everything's on the computer."
Luke Fox	"I think for writing and the word processor, being able to revise and edit, I think it makes that easier."

(Table 7, cont.)

	"A lot of our kids might dislike writing because it hurts their hand. So, when you're typing something, it feels like that's less writing, and you might get more out of that kid because it doesn't hurt. Or, just, everyone likes the shiny flip screen. That's interesting."
Page Rogers	"Definitely writing process. Again, it goes back to feedback and being able to have that immediate feedback from a teacher or that live feedback from a teacher, from peers."
	"Group writing assignments are pretty cool because they can do that all together. They can see what their peers are writing. And I think as far as writing and research goes, that's gonna be the big thing."
Pat Compton	"The writing process is obviously, I think, a given with that, because the revision tools, the fact that we can use turnitin.com for the plagiarism checker, but also use it for peer editing. You can use it for feedback and rubrics and those kinds of things. So that's really great."
Dawn Grady	"Their writing process and peer review. But I even think that, and I guess this is writing process, but modeling writing, and go find evidence of this is really helpful, and then those extension activities and remediation activities."

Efficiency. An enduring theme among teacher responses was direct or indirect references to the idea that one-to-one is valuable because it makes the teacher's job easier, more efficient, or more streamlined. They also all seemed to believe that it promotes organization for students. Ms. Brown stated, "they (students) kind of have their life in there…if they want to make a film, they can do that. If they want to create a visual representation, it doesn't involve going to the craft store anymore and buying a bunch of supplies. You have it all there."

Ms. Smith explained, "It's a lot easier (to teach now). It has made life a little bit easier, at the same time complicated…at the push of a button, they have everything in front of them…it brings ease to teaching."

Ms. Campbell reflected on the complications of teaching before becoming one-to-one:

> It was a lot of paper. A lot of paper workbooks. I remember getting hired for the reading initiative and we went to the training and there were three tiers. There were 3 sets of textbooks and workbooks for each tier, so there were a lot of books in the room. And not to mention the literature books. That was just the reading component. So yeah, tons of books. Now everything is more streamlined.

Ms. Rogers also used the term "streamlined" when describing grading: "We can use rubrics that we upload or pull in from other places, and it makes grading really streamlined…also not having everything on paper is easier to grade at home, and for me it's more about grading and feedback."

Mr. Fox stated that he believes students can achieve more with the device in a shorter amount of time than they would normally need, which makes the device valuable for time management and organization. Table 8 shows teacher participant responses regarding the value of one-to-one devices for teacher and student efficiency.

Table 8
Teacher Finding: Efficiency

Participant	Response
Mona Smith	"I've always loved what technology could do. And the ease that it brings the teachers. Not just the teachers, but the students as well." "So, and it is very easy to do that with technology. It's like telling a teacher, "I already submitted my assignment to you, but you lost it." That doesn't fly anymore. It does not have an affect anymore. Why? Because if it's electronically submitted ... I mean, if you didn't submit it, you didn't submit it. Period. There's not time stamp, there's no nothing. Nothing included, nothing that can be seen."
Dana Brown	"If they want to make a film, they can do that. If they want to create kind of a visual representation, it doesn't involve going to the craft store anymore and buying a bunch of supplies. You have it all there. One thing that I did with my AP seniors last year is they each created

(Table 8, cont.)

	a blog about a book they were reading and kind of made a diary about each chapter that they went through. And I think that was a cool way for them to feel like really, to have a sense of ownership over the process."
Leon Nichols	"We had computer labs here and there and in the library as well. But it was ... If we wanted to do research, it was scheduling time and all that kind of stuff and had to have librarians. So it was a stumbling block, certainly. In terms of research, having the (one-to-one laptops) has been very, very helpful."
Jada Campbell	"I remember getting hired for the secondary reading initiative and we went to the training and there were three tiers. And it was like three sets of textbooks, and work books for each tier. So there where a lot of books in the room. And not to mention the literature books. That was just the reading component. So yeah, tons of books. Now everything's a little more streamlined."
	"The strengths are, everything's kind of there for you."
Luke Fox	"Although since we've had laptops, it is nicer having all the work turned in online."
	"As an English teacher, we're used to our students turning in papers, like short answers or long answers or essays. And when you shift to doing everything on a laptop, it's easy to think, I'll just have them turn in a digital version of the same assignment. But then you're still, instead of going through hundreds of essays, you're going through hundreds of files. So, you need to find a way to reconceptualize of your assignments or your tasks. But you can't just turn everything into an electronic version of what it was before."
	"I was able to push out a story to all of them. We were able to read it, and then they were able to answer some questions about the story. That's a really rudimentary level, but they were able to get something done and submit it to the (LMS) fairly quickly."
	"Of course, that brings with it the challenge of how do you annotate documents. But I think just having the ability to read widely without xeroxing hundreds and hundreds of pages is a lot easier. The laptops make it easier."

(Table 8, cont.)

	"Right now, our society's really in love with technology and data. But if you're not talking about how to use data correctly or how to use technology correctly, it's just gonna be a fun doodad. And it can help a student achieve more in a shorter amount of time than they would normally. But I don't think it's ever gonna be a silver bullet."
Page Rogers	"I think that that's (technology) probably the most useful thing. And also, not having everything on paper, it's easier to grade at home and for me, it's more about grading and feedback, I think is the most important thing."
	"They're using it to manage their projects. Calendars and timelines. They're using it for digital workshops and content, everything."
Pat Compton	"If you needed a resource, you had to physically take yourself to the teacher supply and buy it, you had to go to see what was in the file cabinet and see if there was anything there. And the internet was still very, very limited at the school at that point. We weren't wired in the classrooms yet."
Dawn Grady	"They are collaborating, a lot of peer review, and talk about not having to copy and shuffle papers and not lose anything, doing that digitally helps a ton of my teachers, I have them labeled by genre, and then I have an app database built up to where we can check out books to kids, we can see which kids have had what book. They can write reviews and suggest it to other kids."

Searching. All teachers who were interviewed made varying amounts of references to the belief that one-to-one technology is valuable for students because they can search for information. This could be in the form of research or searching content for examples, ideas, or deeper core content knowledge. Ms. Brown even went as far as to say students should also use devices to research college information: "We want them to be doing academic stuff on there, but we also want them researching scholarship opportunities".

Mr. Nichols said devices are helpful for research: “In terms of research, having the devices has been very, very helpful.”

Ms. Smith emphasized that searching online is sometimes viewed by peers as cheating, however “if they copy everything word-for-word, then that’s cheating. But, with them searching for answers, that’s not cheating…because they are looking for answers. That’s the point. It’s not that they want to copy, they want to find an idea.”

Ms. Grady pointed out that even with all of the searching, the more important skill is making sure that students understand credibility: “I think that’s really important in digital literacy and having students understand credibility and being able to filter what is and is not important or what voices are not important, what’s just noise. And making them responsible digital citizens.” Table 9 describes the responses from each teacher participant regarding the theme of “searching”.

Table 9

Teacher Finding: Searching

Participant	Response
Mona Smith	“With a simple keyword search, they're able to pull up what they need. Well, of course, it still requires them to think critically through those articles. But, regardless, it's still a lot easier.” “Well, when we're reading certain texts that are old, they're able to search new versions of them online, for instance. And I think that's really helped them quite a bit. Or if there's a concept that they don't quite understand, they're able to search. “In the past this is what we called it: They're cheating… they're looking for answers. But today, I don't think they are. They're looking for answers. That's the point. That's the point there. It's not that they want to copy, they want to find an idea. They want to get an idea. What is this that (our teacher) has assigned us? What is this device? Why is it this way? So they want to read something from somewhere. Not necessarily to cheat. Well, if they copy everything word-for-word, then that's cheating. But, with them searching for answers, that's not cheating.”

(Table 9, cont.)	
	"They know how to search for, say for instance, their SAT scores. I mean, they can see these things and they can study them on their own or they can ask, you know, questions and if they do, well and good for them."
Dana Brown	"But we also want them researching scholarship opportunities, creating a schedule for themselves."
Leon Nichols	"The research project that my tenth graders do, the college prep kids do, is search information, good information, not Wikipedia. But access to good information and synthesizing it (is helpful)."
Jada Campbell	"We're gonna do it online but I don't think there's anything that would lead more (in value), except for research of course. All of the (ELA standards) that mention research, they're going to be on the laptops."
Luke Fox	"Searching for texts that aren't copyrighted to get the link to those texts for a soft copy of a document, that's really nice."
Page Rogers	"It really depends on the kid. Some kids are so dependent upon the technology that they're not willing to shut it off and take a minute to think. Sometimes they need to just shut it all down, take a minute, read, think and then you can go to Google, or then you can go and find your answers and your deeper learning."
	"They're using to for research."
Pat Compton	"We were able to like watch a video that had a song in it with a little bit of like pictures from the different civil rights movements that have occurred over the last decade. And then, we had a really rich discussion about that, and then we were able to read some poems and they could interact with the poems and then it's going to build to a short story and then they're going to move out and do their thing and search."
Dawn Grady	"This week we're talking about the foundations of rhetoric and how we talk about argument and how we analyze argument. And, we did it with the Colin Kaepernick ad and the editorials associated with that and then connected it to the Declaration of Independence. (I said) look at this and now go find an editorial, so they can start seeing that these arguments are everywhere and the same strategies are used everywhere. And just that fluidity and just, you can teach

(Table 9, cont.)

	the skills with anything, why not make it to where students can choose something that affects them and that people are already talking about."
	"We do a ton of research, I think that's really important in digital literacy and having students understand credibility and being able to filter what is and is not important or what voices are not important, what's just noise. And making them responsible digital citizens."
	"Research for sure. We don't have library, so their laptop is their library. We have the classroom libraries for sure, but those were not designed for research. I think the access to the databases is invaluable. And giving them that option to learning how to navigate the databases, I mean they don't teach that class in college. It's expected that you know how to do that."

Research Question 2: Principal Perceptions

The findings from interviews with 3 principals showed similarity to the findings from interviews with their teachers, with a few exceptions. Unlike the teacher interviews, writing, efficiency, and searching were not themes in the principal interviews. However, all principals mentioned the value of technology for student collaboration, which was not a theme in the teacher interviews.

The 3 principals who were interviewed had 23-26 years of experience in education. The principal interviews took longer than teacher interviews, spanning from 30 minutes to an hour each. All 3 principals had a wealth of information to share, but not all related to the value of one-to-one technology. One principal, Logan Livingston, spoke in great depth about how technology was a driver to change instructional practices. This principal described the self-reflection that took place in helping teachers understand why they should adopt the technology. Placing worksheets on the computer was not viewed as an appropriate instructional practice by this principal; therefore further innovation and

individualization became the culture of the campus as instruction transformed over the 5 years. All 3 principals spoke about their concerns to increase teacher buy-in by offering professional learning that was teacher-driven and including activities for all levels of teachers. Thematic trends that related to the research question and purpose of this study showed that the principals unanimously viewed technology as potentially valuable for higher-level learning, helpful for providing equality in access (to resources and Google), and a valuable instrument for collaboration.

Higher-level learning. Principal Robinson believed that not only students, but also teachers learn at higher levels with one-to-one student laptops: "At the end of the day, everybody's learning at a higher level".

Principal Livingston had similar thoughts, but then reflected "I don't know if its dependent upon the device". Mr. Livingston went on to reflect out loud, "Hard to say, our kids learn at pretty high levels here. Not every classroom every day, but I don't know the answer to that. I certainly wouldn't say that they don't (learn at higher levels). I don't believe that."

Principal King stated that the technology is worth the investment, but then took another stance regarding higher-level learning, "I don't really believe that kids are just learning at higher levels, I believe that they are learning at different levels."

All principals stated that they believe that the one-to-one laptop initiative in high schools was worth the district's investment, and that they would not want to go back to the way it was before the increase in technology. However, they were unable to confirm that increased academic achievement related to standardized testing was a measure of the effectiveness of the initiative. Like the teacher participants, each principal had his/her own way of measuring success that included teacher observations, teacher adoption, student

use, and increased collaboration in the classroom. Table 10 shows the principal responses regarding higher level learning.

Table 10

Principal Finding: Higher Level Learning

Participant	Response
Kristy King	"High levels lead to an increase in academics. I don't really believe that kids are learning at higher levels, I believe that they are learning at different levels."
Logan Livingston	"Here's this tool that can certainly do that now as you're learning the best ways to use it to continue to make kids smarter and stronger, you still have a responsibility to make them smarter and stronger."
	"Our kids learn at pretty high levels here. Not every classroom every day, but I don't know…I certainly wouldn't say that they don't (learn at higher levels). I don't believe that. I think ... I don't know."
	"I would not want to go back. I really wouldn't. If for no other reason than I think we've passed the five years, but like I said at the beginning, it's really ... I don't know how we'd have the same kind of conversations about what we do in the classroom without it. I really don't. I think we'd just go back…we wouldn't collectively really reflect."
Quincey Robinson	"I think many kids are learning at a higher level. I think, at the end of the day, everybody's learning at a higher level. I'd say many because I think there are students who would tune out if everything was just analog or paper."

Access. Principal King, passionate about project-based learning and STEM, stated "one-to-one is beyond worth it. It's needed. You take that away, you will take away all of the progress we've made. All of it. And, you're taking away windows and access." Mentioning windows referred to offering students opportunities to see outside of their

current situations to the rest of the world via the device. Ms. King believed that the device makes sure that everyone starts from the same access point, regardless of the ability of the family to provide the tool.

Mr. Livingston emphasized that a key value of the device is that it allows all students to access, specifically, information. Mr. Robinson agreed and went further to say that accessing information in the LMS is valuable because "everything needed for class is there". If a student is out of class for any reason, he/she can keep up with the online classroom. All 3 principals said that accessing resources was a key part of the student utilization of devices.

Ms. King believed that access to resources also helps with teacher adoption:

> She (initial district technology support) started thinking about different types of applications that she could show them, and she could go visit with them during their group meetings to show them how to implement tech applications that would directly align to their lessons. That was of great value, and we would constantly get teachers talking about how that was very helpful for them.

Mr. Robinson promoted that the use of web tools on the devices was valuable, but even better, there are resources "to get kids to read more".

Like the teachers who were interviewed, Google was the tool mentioned most in principal interviews. The principals unanimously made references to Google. Mr. Livingston said, "using it (Google) to access information in lessons and presentations… kids share documents and it is valuable to gain traction with teacher adoption." Mr. Robinson believed that Google, like the LMS, gives access to all students to be able to participate in classes. Table 11 describes principal responses regarding equality in access, digital resource access, and Google.

Table 11

Principal Finding: Access

Participant	Response
Kristy King	*Equality in Access* "That was a big eye-opening realization that kids in most schools are struggling because they don't really have access to know what the world looks like outside of this educational bubble. And we're telling them to care about their grades versus what they're studying. The dots started connecting." "Not only worth it, it's beyond worth it. It's needed. You take that away (devices), you will take away all of the progress that we've made. All of it. And, you're taking away windows and access. It's like ... I just have to say this because I feel so passionately about it. If you put somebody in a world like their room in a house and you close the door, you've just got the room. The only access you have to learning is what's in the room. We know that through ... Even though it's just a mechanical device, we are communicating through that device to other rooms and to other places and to other access points of knowledge and experience and stuff. We're creating capacity of our kids, for our investment, our precious assets, that we want to do well in the world that they're living." *Access to Digital Resources* "She (district technology trainer) started thinking about different types of applications that she could show them and she could go visit with them during their group meetings to show them how to implement tech applications that would directly align to their lessons. That was of great value and we would constantly get teachers talking about how that was very helpful for them." "We were expanding the engineering program. We weren't sure what curriculum we were gonna use for engineering, but we knew that a lot of the engineering curriculum that we were able to find was online. It wasn't in traditional books because the technology for engineering is changing so fast, you really can't find it in a textbook anymore. That was another thing that aligned well to technology (finding resources)." *Access to Google* "She's (teacher) having to merge her content with the engineering, the science and the social studies teacher. They decided part of their project work was having the kids develop this press conference. The

(Table 11, cont.)	
	kids needed to communicate with each other, so they couldn't be doing everything on paper because she was realizing, "that's not gonna work very well for communication." They were having to cite different things that they had found in their book and they were having to learn how to do that, again, on the device (in Google). By the end of the project, she was like, "Oh my gosh. I found this online library and the book is included for free for the kids." I don't know, it's changing people's minds."
Logan Livingston	*Equality in Access* "They can show it (their learning) in a lot of different ways and almost all of them have chosen to use some kind of technology to do it. And a lot of those kids do not have that (access to technology other than school-issued devices)."
	Access to Digital Resources "It took time to separate getting good at the tool, versus what does this tool allow us to do that's good pedagogy."
	"They're using Nearpod, they're doing an online lab, or just this really cool stuff and then you go to their English class and it's ... So it's really kind of interesting, it's not one way or the other, it's kind of subject dependent (tool usage)."
	Access to Google "With us getting more access to the Google suite and Google Classroom and all of those pieces...we've gained a lot of traction through the use of that."
	"We're starting to see that as more teachers took on Google Classroom this year, and kids sharing documents, the different pieces."
	"I think sometimes it's to access presentations or it's to begin to ... if they're sharing something, like I said, the teachers are doing Google Classroom, I think that they're using it for accessing information I think the writing, I think we have a lot of teachers who use ... I don't know if they're submitting to Google Classroom or turnitin.com or something like that."
Quincey Robinson	*Equality in Access* "Access to information. That information could be anything that they're doing in research, but more importantly it allows them

(Table 11, cont.)

access to the information if the teacher is utilizing the learning management system well, then all the information that the student needs for that class is located there. That way, if the assignment is there, the lecture is there, the PowerPoints there, the resources are there, the student who goes on an athletic trip or a FFA trip, they miss the class but everything that they need is there."

"It really does do something to the digital divide, and so if you have students who have computers at home and the access to the Internet at home, then by the time they get to college or they get to the workforce, they're gonna be familiar with it. Here, many of these students would not have had access to this type of technology unless they said, "I'm gonna come to the library on my own and use it."

"So by giving 3,000 laptops out at this campus, now when kids go on to the next level, whether that's work, family, or college, they are gonna be familiar with it enough."

Access to Digital Resources
"However, I've been to many additional trainings for specific tools on the devices."

"The first two years we were on vocabulary.com, so we had some teachers who were really pushing that."

"Khan Academy this year. Now that we know that there is the ability to use PSAT and SAT data…that is going to be a major weapon in our arsenal to increase our performance on the campus."

Access to Google
"Okay, I know I need to use Word. I know I need Excel. I know how to use Google. I know how to pay my bills online. I know how to pay my phone bill online. All of these different things that could have been daunting for somebody who doesn't have access to that device is now made plain."

"Final thing is we do have students who utilize the learning management system, or the Google classroom in order to participate in classes."

Collaboration. All principals believed that a value of the one-to-one laptop initiative is to promote student-to-student collaboration and teacher-to-student collaboration. Mr. Livingston stated:

> To articulate it and demonstrate it…even just using different resources that allow people to collaborate and allow people to communicate, again, outside of just who they're sitting next to or anything like that…is some of the different ways that we have kids demonstrate their learning and whether that's creating videos, if it's creating different audio recordings, podcasts, but just some of the different ways that kids are able to do that and collaborate.

Ms. King explained multiple times that one of the biggest values is that the students can utilize the technology to work anytime, anywhere with their peers. Most work at this campus is done within projects, which would not be easy to accomplish without the connection through devices:

> If you were to walk into any classrooms, I would say at all times, over 80% of the kids are highly engaged. Even if they're off task or can be off task, redirecting is even easier because they are more interested in what they're doing and learning, and the project-based learning culture has them interacting such that their peers are helping to take care of that too. They're working in project groups where the lead for a particular project is like, no, you're supposed to be doing this. C'mon we gotta get this done.

Like the other 2 principals, Mr. Robinson stated that the devices allow for more opportunities for students to work together, "If there are assignments that need to be done collaboratively, you don't necessarily need to be in the same room, you could be at home. Wifi access goes with them." Table 12 contains responses from principals regarding the theme of "collaboration".

Table 12

Principal Finding: Collaboration

Participant	Response
Kristy King	"That's when we started really understanding that we could create this dynamic with merged cohort teachers. Then, because the teachers are planning with their devices, and they're teaming together, they're growing stronger relationships and getting empowered and excited about the curriculum that they can rollout. They're planning with the engineering teacher who's using most of their curriculum online. They're looking at each others lessons, being able to work outside of the classroom and work from home on their devices and understanding that dynamic, it's all just naturally and organically creating this very high tech environment." "You're so passionate about contributing and forming relationships with kids and it's a whole educational environment. My teachers never complain about interacting with kids being outside school hours. They don't. They appreciate it, they like it 'cause it gets kids in." "We had also created a master schedule where we had different content teachers working together because part of the grant requirement was that the curriculum was embedded within core curriculum." "Then, because the teachers are planning with their devices, and they're teaming together, they're growing stronger relationships and getting empowered and excited about the curriculum that they can rollout."
Logan Livingston	"Just using different resources that allow people to collaborate and allow people to communicate, again, outside of just who they're sitting next to or anything like that." "The different ways that we have kids demonstrate their learning, and whether that's creating videos, if it's creating different audio recordings, podcasts, but just some of the different ways that kids are able to do that and collaborate."
Quincey Robinson	"It also allows for the students to work together, so if there's assignments that need to be done collaboratively, you don't necessarily need to be in the same room, you could be at home."

Summary

Even with varying levels of experience among the teacher participants, all teachers agreed that higher-level learning, increased access, writing, efficiency, and searching were ways that they believe one-to-one laptops have been valuable for teaching and learning. Two of these themes also prevailed through principal interviews: potential for higher-level learning and access. However, principals all agreed that collaboration was another key area as they gave examples of ways they see students and teachers work together with the technology. Chapter 5 will provide further discussion of these findings in relation to the existing research regarding one-to-one laptops for students. The next chapter will also share recommendations for further research and implications for school leaders implementing or sustaining one-to-one initiatives.

Chapter 5: Discussion, Recommendation, and Implications

Introduction

A variety of research has found that strong leaders, skilled teachers, and the promise of technology to enhance differentiated instruction, collaboration, and 21st century skill development is leading to better outcomes for students in classrooms (Hartley & Strudler, 2007; Manchester, Muir & Moulton, 2004; Mills & Tincher, 2003). Hartley and Strudler (2007) also point out that it is important to understand perceptions of the implementers of these initiatives to support sustainability. This study set out to do just that. Chapter 5 summarizes the statement of the problem and purpose of the study, outlines the methods used in data collection, provides discussion of the research findings, and shares implications and suggestions for future research.

Statement of the Problem

As more school districts incorporate technology into K-12 education, literacy scores continue to decline nationwide (National Center for Education Statistics, 2014). School districts are facing increased pressures to promote student growth while also providing relevant instruction for modern society that will prepare students for their futures (Kaldenberg, Watt & Therrien, 2015). Standardized assessments can also seem misaligned in measuring educational practices that do not follow traditional classroom protocols, but instead use increased amounts of technology and promote the development of 21st Century skills.

Purpose of the Study

This study was conducted in order to explore the perceptions of high school English/Language Arts (ELA) teachers and principals in 3 urban high schools as they work to implement a one-to-one student laptop initiative in year 5. Two research questions guided the study.

- What are high school English/Language Arts teacher perceptions about the value of one-to-one student devices in year 5 of a high school laptop initiative?
- What are principal perceptions about the value of one-to-one student devices in year 5 of a high school laptop initiative?

Overview of Methodology

Qualitative research is "exploratory in nature" and promotes the collection of data to generate a theory (Hays & Singh, 2011, p. 5). Open-ended interviews were conducted with 8 teachers and 3 principals in 3 high schools of a large, urban public school district. Unlike other existing studies, this study specifically investigated perceptions in year 5 of the initiative, after sustainability had been built. An interpretivist approach was applied with the belief that the participant is the main knowledge producer and the researcher's role is to describe practice.

Data collection and analysis. Through teacher and principal interviews, data was recorded, transcribed, and coded. Each interview consisted of 13 common questions designed to generate themes regarding perceived values of one-to-one student technology. The common themes for each group were identified through emergent, open, and axial coding to narrow consistent ideas that emerged from interviews (Hays & Singh, 2011). The researcher did not utilize a third party for coding. A personal device (with a password lock) recorded the interviews, and the researcher analyzed for themes herself through the use of a macro in Microsoft Word in addition to manual processes to sort for trends.

Limitations

There are a few limitations of this study. Only the perceived impact of one-to-one laptops in the classroom was included. Other classroom technologies or mobile devices were not included. Only 3 high schools in a large urban district were utilized for this research. Findings may not transfer to other high schools or other school districts. The

perceptions of students, the community, or central office staff were not part of this study. Observations to confirm what was shared in interviews were not conducted.

Significance of the Study

The Partnership for 21st Century Skills (2003) released a report advocating to better prepare students for the demands of their worlds. The report states that knowledge beyond core subject areas is important. They found that people should be able to apply knowledge, conduct analysis of information, and work collaboratively. As school leaders, school boards, and community members look for evidence showing the return on investment for educational technology, school districts typically immediately look to standardized test scores (Warschauer, et al., 2010). Whether test scores alone can be utilized to measure the value of school technology initiatives remains to be seen. In this study, it was found that perceptions of value are variable but almost always do not include the perception that there should be increases in standardized test scores. The qualitative data can lead to further questions that can be answered quantitatively and suggests new strategies for professional development. The outcomes of this study can inform the work of school district leaders as they decide to increase district technology, determine professional learning priorities for teachers, or plan for sustainability of current technology initiatives.

Summary of Findings

Research Question 1: Teacher Perceptions. Eight teachers openly shared their experiences in teaching with one-to-one student devices. All agreed that higher-level learning was potentially occurring in their technology-rich environment. They also consistently mentioned that a major value of the technology was that it provides access to students. This access is equal for all and allows for the incorporation of a large library of digital resources, especially the Google suite (G Suite). Additionally, all 8 teachers discussed the value of technology in growing students as writers, which includes drafting,

revising, feedback, and publishing or presenting. Teaching is more streamlined, and students are more organized because of the efficiency provided by the technology. And, finally, teachers believe the devices are valuable for students to search. This includes searching for ideas, for information, for examples, or researching.

Research Question 2: Principal Perceptions. Three principals from 3 different high schools were interviewed. All 3 schools met state standards and were of varying sizes within the same large, urban school district. Each principal shared various ideas about one-to-one laptop initiatives. They all agreed upon 3 themes: Students potentially learn at higher levels with the technology (but not just because of the technology); students have equal access to valuable instructional resources, especially Google; and collaboration between students as well as students and teachers is part of the value of having one-to-one devices.

Discussion

Five teacher themes and 3 principal themes emerged as research questions guided interview items to determine perceptions of the value of one-to-one laptop initiatives. Teachers discussed the value of laptops for higher-level learning, access, writing, efficiency, and searching. Principals agreed with higher-level learning and access, but also added collaboration as a key value. Some of these trends in findings were similar to existing research on this topic, gathered during the initial implementation of such initiatives. Other findings of this study were not as present in current research and may add to the body of knowledge on this topic or encourage further research to learn more.

Classroom Technology and ELA Teachers. It has been thought that a possible disconnect between laptops in the classroom and literacy growth is the slower pace at which ELA teachers adopt the technology (McGrail, 2007). For this reason, ELA teachers were selected to be the interview participants for this study. All of the teacher participants

reflected on their own adoption of the technology or mentioned others who were slower to adopt at their campuses. In year 5 of the initiative, all 8 teacher participants seemed to be sustained in the initiative as they discussed their beliefs that the expenditures were worth it, that they would never want to go back to a traditional classroom environment, and that they believed students now potentially learn at higher levels. Interestingly, and possibly a matter for further research, the school district's writing scores dropped the year before the interviews were conducted (per the public board meeting presentation posted online). Even though teachers discussed writing as a key area where technology has added value, and some even said that students now write more, scores have declined. It is worth noting that scores across the state appeared to decrease as well.

The Value of One-to-One Technology. Like this study, Lei and Zhao (2008) reported that teachers believe laptops are valuable. A number of existing studies, discussed in chapter 2, found the same. The extent to which teachers can describe the value is variable and may or may not be related to the type of school district (public or private). Zheng, et al. (2016) conducted a meta-analysis of current research regarding one-to-one student laptops. They found that there was an increase in academic achievement in writing and English, specifically for drafting, revising, sharing, and accessing information. Additionally, they found increased student-centered and individualized instruction, an increase in project-based learning and increased enthusiasm among students. Increases in teacher-student and teacher-home relationships were also recorded in their findings (Zheng, et al., 2016, p. 1075). This study of 8 teachers and 3 principals had similar findings. For example, the teachers in this study found value in writing with the technology. While individualized learning, project-based learning, and increased enthusiasm were mentioned by some of the teachers, these were not prevailing themes.

Also, relationships between teachers and students and teachers and home were not unanimous themes in the teacher findings of this study.

Not all existing research about one-to-one technology has been positive. Cuban (1994) worried that extensive use of classroom computers may "corrode" teacher-student relationships and the importance of students learning to work collaboratively. The principals in this study all agreed that collaboration has increased since introducing the one-to-one initiative, which does not support Cuban's prediction that students would lose their ability to work together.

When comparing this district's one-to-one student laptop initiative to one of the first districts that became one-to-one, there are some differences. One of the first one-to-one districts, Henrico County Public Schools in Virginia, reported increased communication, increased self-directed learning, and increased student motivation as part of their initial work (Hartley & Strudler, 2017). While some participants in this study mentioned student motivation and communication, none of these themes emerged unanimously when coding teacher or leader transcripts from this study. However, commonalities can be made with Maninger and Holden's study (2009) of a middle school one-to-one initiative in a big city, which found that students had increased amounts of group work (collaboration) and access.

Implications

As technology adoption grows significantly in public education and school districts become increasingly interested in one-to-one technology programs, the United States continues to rank below proficient in reading by the end of high school (National Center for Education Statistics, 2014). Districts are forced to find innovative ways to increase achievement and combat illiteracy by appropriately allocating funds where they can make the most difference (Kaldenberg, Watt & Therrien, 2015).

School district leaders, school campus leaders, and teachers are all part of the successful implementation of technology initiatives. Clear vision from those who fund the initiative, implement, monitor the effectiveness, and put the resource into classroom practice must be sustained and communicated effectively. As school districts are increasingly asked to do more with less federal and state funding, the large expenditure of one-to-one technology must be justifiable. District and campus leaders should be able to articulate the value of technology initiatives and provide clear direction for implementation for sustainability. Once this is set, communities, students, and teachers must be included in the planning to ensure best use of the technology, appropriate professional learning, and appropriate measures of success. If principals are expecting one-to-one student laptops to add value in the area of student-to-student and student-to-teacher collaboration, but teachers do not agree that this is a key value of the devices, then there is a disconnect in expectations. Also, if what teachers see as the value (such as writing, searching, and efficiency) is not consistent with what principals look for in technology use, then there is misalignment in how to measure effectiveness of the initiative.

If ELA teacher mindsets were to shift, further conversations about technology could take place as teachers plan for ways to engage students in the heart of their subject- literacy, communication, text, and language (McGrail, 2007). First, it is important to understand how ELA teacher mindsets can shift given their perceived value of having the classroom technology. High school dropouts cost about $260,000 in lost earnings, taxes, and productivity and over 6 million students drop out each year in the United States (Annie Casey Foundation, 2014). Districts continue to have the challenge of allocating the appropriate budget to start and maintain technology initiatives (Rhor, 2014).

The National Commission in Education Excellence reported (A Nation at Risk) that high school graduates must understand technology as a tool for computation,

communication, and information and use it for personal and work-related purposes (National Commission on Excellence in Education, 1983). The No Child Left Behind Act of 2001 and the Elementary and Secondary Act (ESEA, 2001) encourage that all students should be technologically literate by the end of 8th grade. Policy leaders' encouragement and the belief of school districts that technology can engage students and prepare them for their futures, this topic continues to be one of the most hotly debated topics in education (Zheng, et al., 2016) which further supports the implications of this research study.

Assertions and Recommendations for Further Research

Based on the findings and themes of this study that generate possible theories, it is recommended that further research be conducted in various areas. The following assertions could be made given the limitations and findings of this study: (a) It is possible for English/Language Arts teachers to adopt one-to-one technology and sustain its use because there is value in the tool, (b) one-to-one provides equality in access for students and helps to level the playing field in the classroom, (c) access to the G Suite of resources is a main use of technology in the high school English/Language Arts classroom, and (d) standardized test scores may not measure the value of one-to-one student technology.

The following research questions for future studies can further add to the body of knowledge on this topic and provide district or campus leaders with information needed to make technology decisions:

What is the effect of one-to-one devices on closing achievement gaps? All participants in this study described equality in access for all students as a key value of the one-to-one student laptop initiative. Batane (2002) shared that access can be measured quantitatively by studying the closing of achievement gaps. However, would this be best measured on standardized assessments? With Warschauer (2009) emphasizing that

standardized assessments do not measure the skills that the use of technology promotes, it may not show the achievement gap gains due to misalignment.

How do one-to-one technology initiatives contribute to change in instructional practices? Donovan, et al. (2007) found that leaders worry about adequate training for pedagogical shifts that come with technology initiatives and that one-to-one laptop initiatives require a shift toward student-centered practices. "The image of technology as a catalyst for change is almost universally shared" (Culp, et al., 2005, p. 283). All principals in this study spoke about changing mindsets of teachers because of the introduction of additional technology to their campuses. One principal also spent considerable time reflecting on how the technology caused staff to question their instructional practices now that there was a new tool for differentiation and engagement.

What is the role of Google in K-12 education? How has this suite of tools changed teaching and learning? The most common theme throughout all teacher and principal interviews is that Google was being utilized in various ways as the number 1 resource that students are accessing on their devices. The purpose of using Google was not unanimously agreed upon in this study, but included collaboration, word processing, sharing, feedback, presenting, turning in work, and interacting with content.

How do principals utilize teacher leaders to build capacity of technology integration in an individualized manner? The interview questions in this study led many of the teacher and principal participants to discuss professional learning practices at their campuses. Many stated that professional learning had become more differentiated and was almost always more valuable when led by teachers on their campuses (versus district-wide professional learning).

Appendix: Interview Protocol

Introductory and Ice Breaker Script and Questions: The purpose of this study is to gather your honest perceptions about the value of one-to-one student devices in the high school classroom. All of the questions should be answered only about one-to-one laptops. Other classroom technologies such as smart boards, tablets, or laptop carts are not included. What is your role on the campus? Tell me about your teaching (or leadership) experience. Why did you become a teacher/leader? How long have you been in education? How long have you been at this campus? How do you describe yourself in the use technology?

1) What was it like to teach/lead before your school became one-to-one?
2) How were your first 3 years of the initiative different than now? What do you wish you had known 5 years ago?
3) What professional learning have you attended for one-to-one integration? How has this staff development affected teaching?
4) What does 1:1 provide for your classroom (or school) that may have been difficult to accomplish without each student having his/her own device?
5) What are the strengths of the initiative? Challenges?
6) How do students use the devices in the classroom? Home?
7) Are there aspects of the English/Language Arts scope and sequence that lend themselves better to student laptop integration?
8) What is the role of campus leaders in the implementation of a one-to-one laptop program?
9) How does this initiative change teaching/leadership?
10) Do students learn at higher levels because of the device? What evidence do you base this on?
11) Have you noticed any differences or challenges with specific student populations in this initiative?
12) Is it worth the investment to provide each student with his/her own device?
13) Is there anything else that you would like to add that I did not specifically ask you about?

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Vita

Annie Wolfe graduated from Collins Hill High School, part of Gwinnett County Public Schools (Georgia), with honors in May, 1999. She then attended Georgia State University where she completed her bachelor's degree, as a Faculty Scholar, in middle grades education with a focus on mathematics and English/Language arts. While at Georgia State University, Annie also had the opportunity to study and teach abroad in Vlissingen, Netherlands. In May, 2003, Annie completed her undergraduate work and began teaching 7th grade English/Language arts at Creekland Middle School in Gwinnett County. During the next decade at Creekland Middle, she also taught 6th grade mathematics, math intervention courses for middle school, and became an instructional coach and math specialist while simultaneously developing and implementing online curriculum with the Gwinnett Online Campus. Annie earned her master's degree in Educational Policy and Administration at the University of Georgia in 2008. In late 2012, she took a new position at the Gwinnett County Public Schools district office supporting K-12 curriculum and instruction as Lead Program Facilitator for Instructional Technology. She joined the Houston Independent School District in 2014 as the Officer of Secondary Curriculum and Development where she leads the development of middle and high school core curriculum, professional development, health and physical education, languages other than English, STEM, secondary literacy initiatives, instructional materials adoptions, and the district's nationally-recognized, one-to-one, high school laptop initiative called PowerUp. She began her doctoral work in 2016 with cohort 27 of the Cooperative Superintendency Program at the University of Texas, Austin. Annie can be reached at anniewolfe@utexas.edu.

This manuscript was typed by the author.